

## CHEN.3170 Applied Engineering Problem Solving

### *A Short Quiz on*

### *Function Evaluation and Plotting in Matlab*

Newton's law of motion can be used to derive the following formula for the maximum height,  $h$ , achieved by an object thrown with speed  $v$  at an angle  $\theta$  to the horizontal:

$$h = \frac{v^2 \sin \theta}{2g}$$

where  $g = 9.8 \text{ m/s}^2$  is the gravitational acceleration.

Write a complete Matlab script file to create a summary plot containing  $h(v)$  for four different values of  $\theta$  (for  $\theta = 20^\circ, 40^\circ, 60^\circ,$  and  $80^\circ$ ). Note that the height,  $h$ , is a function of two variables and it should be stored as a 2-D array,  $h(v,\theta)$ , in your Matlab program. Create a single well-labeled plot that displays the computed results in a quantitative fashion, where  $v$  varies from 0 to 20 m/s. Use a single plot command to get all the desired information on the plot (i.e., you do not need to worry about different line styles). Be careful with the Matlab syntax! You can use either **scalar** or **vector** arithmetic (i.e., **do not** use the *meshgrid* command in your code).

Write your Matlab code below: